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Comments:

From the SCS Chief

Meeting the rising demand for range grazing from a degraded resource base will be an uphill fight.

Soil erosion is robbing millions of acres of rangeland of its capacity to produce enough quality forage for livestock. Of the 414 million acres of nonfederal rangeland, 60 percent is in poor or fair condition and 30 percent is threatened by excessive erosion.

The first line of defense against erosion on rangeland is good vegetative cover. Management of rangeland vegetation affects livestock production, soil condition, water quality, wildlife habitat, and recreation potential. The Soil Conservation Service helps ranchers maintain or improve vegetative cover through conservation planning. Brush management, range seeding, fencing and water facilities, and/or improved grazing management are then applied by the rancher to improve range condition.

SCS also needs to help land users predict accelerated erosion on rangeland before it becomes a problem. Since SCS began, its methods of appraising rangeland condition have provided sound information for management decisions. With limited funding and the need to direct conservation assistance where it can accomplish the most, we will require even more definitive information on rangeland erosion.

Inventories of total soil movement—including geologic erosion—can mask rangeland areas where conservation measures are truly needed. The Universal Soil Loss Equation, for example—used to determine erosion rates in the 1977 National Resources Inventory—predicts total soil movement but does not distinguish between geologic erosion and accelerated erosion. We recognize the need to refine the way we inventory rangeland erosion.

SCS is evaluating a modification of short-duration grazing, called cell grazing. This was introduced into the United States about 5 years ago. We are also improving prescribed burning methods for controlling undesirable vegetation. Are you up-to-date on developing range technology as we strive to help ranchers improve production and protect the natural resource base?



Cover: A long-term study of the effects of range improvement is being conducted on the Saval Ranch in northeastern Nevada. Michael Ralphs, Saval Ranch manager, rounds up part of the herd being monitored in the study. (See article beginning on page 8.)

Range and Pasture Improvement

Zuni Indian Is First to Reseed, Improve Range

David Wyaco of the Zuni Indian Reservation in Zuni, N. Mex., knows what it feels like to stand alone.

With the encouragement of Wayne Fjeseth, Soil Conservation Service district conservationist in Gallup, N. Mex., and Albert Abee, Bureau of Indian Affairs (BIA) range conservationist in Gallup, Wyaco became the first member of his tribe to participate in a sagebrush management and range reseeding program.

It was not an easy decision. "Just about the whole tribe was against me," Wyaco said. "They thought I was making a terrible mistake. They didn't think that you could grow grass on land that produced nothing but brush and weeds, and they were skeptical of the Government's involvement."

But Wyaco didn't have much choice. It was either give Fjeseth and Abee and their ideas of range

conservation a chance or give up his part-time sheep operation (Wyaco is a highway engineer with BIA in Gallup and a graduate of New Mexico State University).

"My 1,200 acres were depleted to the point that I could only graze 50 head of sheep," Wyaco recalled, "which was nothing compared to what the land used to carry." As a boy, Wyaco herded sheep on this land, which had belonged to his father and uncle, and his grandfather before them. "I didn't want to end a family tradition," he explained, "but it just was not profitable to continue."

So with a great deal of courage and an even greater amount of hope, Wyaco stood up at a Zuni livestock committee meeting in 1979 and said that he would sign up as a district cooperator with the McKinley Soil and Water Conservation District and do whatever was necessary to restore productivity to his land.

Because of the cost involved, Wyaco could only afford to reseed



Above left, before David Wyaco signed up for range reseeding, his depleted range supported mostly sagebrush and weeds. Above right, after reseeding, wheatgrass grew to an average 2½ feet high.

about half of his grazing land (some of Wyaco's land is mountainous and not suitable for grazing).

The total cost for plowing and reseeding the 310 acres chosen for the program was \$15,500, or \$50 per acre. The land is valued at about \$100 per acre. Wyaco received \$3,500 in cost-sharing assistance from USDA's Agricultural Stabilization and Conservation Service.

At Fjeseth's and Abee's suggestion, the area was reseeded with three varieties of wheatgrass—'Arriba' western wheatgrass, a species native to New Mexico, and 'Greenar' intermediate wheatgrass and 'Luna' pubescent wheatgrass, which are not native species but are well adapted to that part of the country. All three varieties were developed by SCS plant materials centers. The soil on Wyaco's land is loam to clay loam and the annual precipitation is 15 inches.

"When planting first began in July 1979," Wyaco said, "it was dry, and I really began to have some doubts. I thought, 'Maybe my friends and neighbors are right; maybe I have made a terrible mistake.' But then in August the rains came and the plants started to come up." However, Wyaco didn't really rest easy until the next spring, when the plants began to take off like wildfire. Today the grass is almost waist high—averaging about 2½ feet.

According to Fjeseth, production of usable forage is up from a mere 100 pounds per acre prior to reseeding, to 4,000 pounds per acre today. And soil erosion has been reduced from 8 to 10 tons per acre to less than 1 ton.

Wyaco began grazing the reseeded area in June 1981. "I can already tell a big difference," he said. "This summer the sheep took only 2 or 3

hours to graze, compared with about 8 to 10 hours in the past." He relies on herding rather than fencing to manage the range, moving the sheep from one area to another about every 3 weeks.

Wyaco is looking forward to expanding the size of his herd—Fjeseth and Abee have predicted that he will be able to triple it in the next 3 years as a result of increased forage production and planned grazing management. He eventually wants to add cattle to his operation, and he plans to reseed the other half of his grazing land, "although I have to get my children through school first."

Since Wyaco's success story, about 10 other Zunis have signed up with the district and requested SCS assistance. "It turned out just fine," Wyaco smiled, "but I sure had some nightmares about it." Nevertheless, he said he would do it all over again if given the opportunity.

Martha Newton,
speechwriter, Information and Public Affairs, SCS,
Washington, D.C.

Teamwork for Conservation

Through a coordinated plan, known as a "Long-Term Group Pooling Agreement" (LTGPA), five ranchers in northeast California and northwest Nevada are working with Government specialists to improve range condition on 180,000 acres. The five ranchers own 30 percent of the land and the rest is administered by the Bureau of Land Management (BLM), U.S. Department of the Interior.

"This is a new approach to range management for us," said Ernest

Eaton, Soil Conservation Service district conservationist in Cedarville, Calif. "But we've worked out the kinks that come with any new system, and what we've learned will make it easier for others who are interested in this form of coordinated planning.

"The situation was less than ideal when we started. The land had almost no fences on it and really needed to be planned as one unit," said Eaton. BLM had received a court order requiring a plan to improve the public rangeland. Ranchers were told that their grazing permits were being cut, some by as much as 70 percent, to improve the range. The ranchers appealed the cuts and until the appeals were settled, no changes could be made in the grazing permits.

"At that point the ranchers still faced losing their grazing permits and BLM was getting nowhere on their court-ordered range improvement. This gave both sides an incentive to work out range improvement alternatives that would meet everyone's needs," Eaton said.

During many late night meetings, SCS, BLM, and the ranchers prepared a plan that would improve both private and public rangeland. SCS coordinated the efforts, supplied technical information, and worked through the Vya and Surprise Valley Resource Conservation Districts to develop economical alternatives.

The first LTGPA was approved by USDA's Agricultural Stabilization and Conservation Service (ASCS) in October 1980. "Local and State ASCS offices and the conservation districts backed it all the way," said Eaton.

The LTGPA makes \$75,000 available for conservation improvements

on the private portion of the grazing land over the next 5 years. One way the group plans to use the money is for seeding the better portions of the range to early growing crested wheatgrass. This allows ranchers to get cattle off expensive dry hay earlier in the season. Then when the native grasses are ready to graze, the cattle are moved over to them.

"By seeding part of the range we hope to improve all of it," said Eaton.

Besides 6,730 acres of seeding, the plan calls for removing brush on 7,733 acres, building nine reservoirs, and developing seven springs. All this work will prepare the privately owned grazing land for deferred rotation grazing—the heart of the plan.

Cattle will be deferred from using the native range until the new seedlings have had a chance to set seed. Then every other year they will be rotated to a different part of the range. Thus the ungrazed portion will have a chance to rebuild itself and production will improve.

The ranchers and BLM are pleased with the progress of the project. The group's goals are being met and a vital resource is being protected. Word about the project has spread. "I have 13 more requests for coordinated plans on my desk!" Eaton said.

Robin Frazier,
public information specialist,
SCS, Redding, Calif.

Conservation Tillage Goes to Pasture

A growing number of soil and water conservation districts in the Northeast are buying pasture conservation tillage planters and renting them to farmers. For example, the John Marshall Soil and Water Conservation District in Fauquier County, Va., bought a planter in 1981 and rented it to farmers who renovated pastures and planted forage and hay crops on more than 800 acres. Farther north, a Rhode Island conservation district bought a planter in 1980 and rented it to seven farmers in 1981, mainly to plant alfalfa for hay.

The U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service provided cost-sharing funds to the farmers in the Southern Rhode Island Conservation District to pay for rental of the planter and the cost of pesticides, fertilizers, and lime. This provided a great incentive to farmers and helped launch the program, according to Dr. Robert Wakefield, a district director and Cooperative Extension Service specialist at the University of Rhode Island.

Dr. Wakefield and Philip Morneault, the Soil Conservation Service district conservationist, provided the latest conservation tillage information to the Rhode Island farmers to help them manage their pastures successfully.

Wakefield said that conservation tillage planters are ideal for the Northeast where farmers are reluctant to plow because they don't want to remove the loose stones on the surface of many pastures.

Conservation tillage gives farmers a way to improve their forage and hay crops without plow-

ing and exposing pastureland to erosion. It also saves moisture that could determine the success or failure of a crop planted in the dry fall when most alfalfa crops are planted.

In Virginia, Harry Jones, Jr., SCS district conservationist, Warrenton, and Tom Coda, John Marshall District soil conservationist, worked with the conservation district and the Cooperative Extension Service of Virginia Polytechnic Institute and State University to be sure farmers used the planters properly and managed their pastures wisely.

Coda said that farmers are afraid to take risks on new technology so the district is lessening the financial risks of trying pasture no-till by purchasing and maintaining the planter. District officials plan to be as successful introducing no-till to pastures as they were on cropland after they rented a no-till corn planter in 1969.

Wakefield attributed the success of his project to the cooperation between his district and several USDA agencies. Coda agreed, and added universities, local banks, equipment dealers, and farmers to the list of essential participants in this type of project.

The two districts are examples of the many districts buying conservation tillage planters to bring long overdue improvements to small, worn-down, eroding pastures of the Northeast.

Vicki Maddox,
information officer, Virginia Soil and
Water Conservation Commission,
Richmond, Va.

Elmer E. Offerman,
public information officer, SCS, West Warwick, R.I.

News Briefs

USDA Tests Variable Cost-Share Program

This year, USDA's Agricultural Stabilization and Conservation Service (ASCS) will begin a 1-year pilot project to test a new way to determine Agricultural Conservation Program (ACP) cost-share levels.

Instead of a fixed cost-share level for each county, ASCS will try a variable cost-share level tailored to each farmer's soil erosion problem.

More than 70 counties, mainly in the Midwest and Northeast, volunteered for the project. With Soil Conservation Service concurrence, each ASCS committee in these counties chooses one of two ways to compute the cost-share level: by the percentage of soil loss reduction predicted with the Universal Soil Loss Equation and Wind Erosion Equation or by the predominant land capability classification. As before, the maximum cost-share level is 75 percent.

USDA's Extension Service and SCS helped design the program and will provide technical assistance and information.

ASCS limited the project to cropland with soil loss exceeding the tolerance level (T value) and to practices that control sheet or rill erosion, such as conservation tillage and terracing.

ASCS expects the variable cost-share levels to save more soil per dollar than the fixed cost-share level. ASCS will use the results from this pilot project in considering changes in the ACP and other cost-sharing programs.

USDA Project to Help New Farmers and Ranchers

As part of USDA's new agricultural and rural development efforts, Under Secretary for Small Community and Rural Development Frank W. Naylor, Jr., is directing an interagency pilot project to save family farms.

Newly formed local Full-Time Family Farmer and Rancher Development Committees in 81 counties in 10 States will help new or part-time farmers and ranchers use Farmers Home Administration (FmHA) loans and other USDA programs to expand to successful full-time commercial operations.

Committee members come from soil and water conservation district boards, county committees, and agribusiness. The committees will ask successful farmers, ranchers, and management experts, including retired persons, to be volunteer counselors for project participants.

USDA officials from several agencies, including the Soil Conservation Service, will serve as ex officio members of the local committee. SCS will inventory and evaluate the natural resources of each applicant's land to help the conservation district member of the committee review applications with the committee.

FmHA decides who to accept in the project. Then SCS works with those who are accepted, other agency representatives, and the local committee to develop plans for conservation, production, management, and financing.

The participants must qualify for commercial credit within 10 years. If this pilot project succeeds, next year it will expand to other States.

Early Water Outlook Appears Good for Most of West

The first snowpack surveys of the season, conducted by the Soil Conservation Service, indicated favorable water supplies in most of the West this summer. The surveys showed that most rivers in the region should receive normal to above normal runoff when snowmelt begins in the spring.

Generally good reservoir storage levels on January 1, coupled with heavy early winter snowfall over most of the West, made prospects excellent. However, below normal runoff was forecast for Montana, Arizona, and New Mexico.

Small Farms—Big Business in the Northeast

Small-scale farming is on the rise all across the country—reflecting the population's migration from urban to rural areas. The trend is especially strong in the Northeast where more than half of all farms are considered small scale. The growing number of small-scale operations in the Northeast and elsewhere generated a special research symposium last November at the USDA Agricultural Research Center in Beltsville, Md.

The symposium, the first of its kind, was called to highlight the achievements of research geared to the small family farm and to identify pressing research needs. Although the symposium emphasized the needs of the northeastern small-scale enterprise, it was national in scope.

The 600 people attending the symposium came from the private sector, business, industry, farming, and Federal, State, and local government as well as research. Speakers from all parts of the country described the results of Federal, State, and private research in several areas. Topics included the production of the major small farm commodities—vegetables, fruits, berries, forage, and livestock. Also discussed were new technology adapted to small farms; marketing techniques; economic impact of land costs, energy, and equipment; and socioeconomic and family considerations. Many of the findings described are applicable to large enterprises as well. The research

needs identified included resource management and more farm equipment adaptable for small-scale operations.

"There is a growing realization that small farms are not a declining backwater of American agriculture," said Howard W. Kerr, Jr., coordinator of small farms research for the northeastern region and co-chairperson of the symposium. "In fact, today, small farms in the Northeast are beginning to have a dominant role in that region's agriculture."

According to Steven C. King, USDA's northeastern regional administrator for the Agricultural Research Service (ARS), the "back to the land" movement meant "back to the drawing board" for agricultural scientists. The question was not how a small-scale farmer could become a big one, but how a small farmer could stay that way and still be successful.

"Our original bewilderment has been replaced by a growing list of researchable problems and accomplishments," said King at the symposium. "Our scientists no longer ask, 'What can I do?' Now they want to know where the resources are to do it."

By and large, the resources have come from Congress, which first earmarked \$3.5 million for small farm research in 1979. These funds, targeted to benefit the Nation's 1.3 million small farms, are primarily distributed to ARS locations in Charlestown, S.C.; Boonesville, Ark.; and Beltsville, Md., said King.

Nearly half of the Small Farms Research Program funds have been allocated to the Beltsville location and the Northeastern United States—and with good reason. Contrary to the national trend, farms in the heavily populated Northeast are

increasing in number while their size is decreasing. The growth and economic prosperity of these small farms are expected to increase about 16 percent in the next 5 years, especially near metropolitan areas.

In 1981, USDA funded more than 50 small farm research projects in the Northeast. Thirty-eight of them were conducted at or in cooperation with the Beltsville Agricultural Research Center. There and elsewhere, the work has focused on soil fertility, fruit and vegetable production, forage and pasture research, livestock and poultry, and post-harvest technology.

Although approaches to these subjects vary within each region, all small farm research has taken into account the production economics and marketing problems special to small farms. Livestock disease and parasite research has been funded in areas not generally thought of as small farm regions in order to take advantage of special expertise. "Above all, we have seen the need for coordination and carefully targeted planning," said King.

Recently, the Soil Conservation Service cooperated with several other USDA agencies on 17 small farm assistance projects around the country. "SCS provides continuing technical assistance in resource management to the Nation's growing population of small farm operators," said Douglas Sellars, SCS rural development specialist in Washington, who attended the symposium. "We are helping them to protect the soil and water as they strive to maximize their production potential. Optimizing agricultural production on small farms is important to both national food and fiber supplies and rural development."



Sweet corn, fresh from a roadside stand or farmers' market, is a summer-time favorite of Northeastern consumers and a major cash crop for the small-scale farmer.

CONSERVATION Research Roundup

Scientists Study Long-Term Effects of Rangeland Improvement

A Nevada ranch is a working laboratory for a long-term study that researchers expect will lay a new scientific base for grazing livestock on sagebrush lands in the West.

Researchers say the study's results may be applied directly to some 100 million acres of sagebrush lands in the 11 Western States. They're also seeking insights into grazing practices on about 200 million acres of other western rangelands.

"We need to see the total picture of cattle grazing and find out what grazing practices are suited to the land—from the environmental and economic standpoints," says the principal investigator, Richard Eckert of Reno, a range scientist for the Agricultural Research Service in the U.S. Department of Agriculture.

Eckert says this is the first long-term study of its size to examine what happens to soil, vegetation, water resources, and wildlife where cattle graze on sagebrush lands. Seven State and Federal agencies and the Nevada Cattlemen's Association are cooperating in the study.

Jeanne Edwards, who volunteered her Saval Ranch near Elko for the study, said, "The western rangelands are going to continue to face increasing pressures for use—for oil shale, coal, minerals and lumber, and as a place for hikers and skiers. It is imperative that the sciences come into play in finding answers to a rational land use."

Edwards' ranch spreads over 59,000 acres in northwestern Nevada. The study area includes about 45,000 acres of leased Federal land and about 14,000 privately

owned acres on which Edwards has 1,200 head of breeding stock.

Active in the Society for Range Management and the American Forestry Association, Edwards received an award for her outstanding work from the Nevada Section of the Society for Range Management in 1979.

"Resources of the range can be managed to work together, not at cross purposes," says Edwards, "but it will take credible scientific findings and some workable new ideas that ranchers can adapt to their own needs for an economically viable cattle operation."

According to Eckert, "The study will go a long way toward identifying how and where rangeland can reach its potential, in economic and environmental terms, for raising cattle as a food source. We are not looking for short-term answers to grazing problems. The 10 or more years going into this study will take us through an interim period and one full grazing cycle of intensive management, giving us the broad research that is needed."

Specific research phases of the study began on the ranch in spring 1981. The first stage of the study, a 3-year inventory of the ranch's natural resources, was completed in 1980.

"We are taking a multidisciplinary approach in this study," Eckert said. "It involves Federal and State researchers from the U.S. Department of Agriculture's Agricultural Research Service, Soil Conservation Service, and Forest Service at the Humboldt National Forest and the Intermountain Forest and Range Experiment Station; the U.S. Department of Interior's Bureau of Land Management and U.S. Geological Survey; the Nevada Department of

Wildlife; and the University of Nevada-Reno's College of Agriculture."

According to Leland Campsey, SCS district conservationist at Elko, SCS completed a soil survey of the test area in 1978 and correlated the soil series to range sites. Range conservationists determined range condition and trend. SCS also assisted with preparing the environmental impact statement for the study and developing a coordinated resource management plan for the entire study area. In addition, the agency is leading efforts to improve management of the ranch's irrigation system.

"This long-term study will provide baseline data on resource conditions before range improvement and afterwards," says Campsey. "We are taking an intensive look at the effects of rangeland improvement on the resource base—soil, water, vegetation, and wildlife—and on beef and hay production. The study will tell us, for example, how crested wheatgrass seeding affects sage grouse habitat."

Scientists and ranch hands will study the trout and water in the streams, the native plants and trees, and the food and cover for mule deer, sage grouse, and other wildlife as carefully as they study cattle on the ranch, says Eckert. As grazing practices are worked out, researchers will use monitoring systems precise enough to detect changes in the land's resources.

Through the study, researchers hope to increase forage production; protect water quality; develop planned grazing systems to protect the environment and increase production; study grazing schedules of cattle and wildlife to make them more compatible; measure the

effects of grazing on streamflow, water chemistry, sediment in runoff, and soil water infiltration; assess the nutritional carrying capacity of major range sites for livestock and wildlife; and reduce soil losses on grazed lands.

Eckert says research results will be used to evaluate economic and social benefits and to determine costs and advantages of the range management systems studied. Asked how she could afford to provide her land, cattle, and the time and experience of her ranch personnel for the study, Edwards answers, "How can I afford not to?"

Soil Erosion Reduces Wheat Yields

Results from the first 3 years of an erosion experiment by the U.S. Department of Agriculture's Agricultural Research Service (ARS) in southeastern Idaho show that soil erosion significantly reduces yields of winter wheat.

The two objectives of the experiment are to measure the loss in productivity of soil due to erosion and to learn how to use fertilizers to restore eroded land to its original productivity.

"In arid areas such as southeastern Idaho, you always think of water as a limiting factor when you have good fertility, but top yields may depend on topsoil depth and not water alone," said Dr. Truman Massee, an ARS soil scientist at the Snake River Conservation Research center in Kimberly, Idaho.

The study area is nonirrigated cropland with a 4- to 12-percent slope, in the foothills of the Rocky Mountains south of the flat, irri-

gated fields in the Snake River Plain. The foothills area loses an average of 8.5 tons of soil each year.

In 1978, Dr. Massee and his colleague, Dr. Harold Waggoner, prepared 96 plots for the experiment. They scraped 6 inches of topsoil off some plots and 12 inches off other plots, left some plots undisturbed, and added 6 inches to some plots.

Half of the plots are in a 2-acre field with a silty loessal soil of the Rexburgh series, with an east slope of about 3 percent. The topsoil in this field is 14 to 17 inches above an infertile layer of lime deposits mixed with soil that underlies most soils in southeastern Idaho. The other plots are in a 2-acre field on the side of a hill a mile away. This field has a silty loessal soil of the Newdale series, with a west slope of almost 8 percent and 7 to 11 inches of topsoil above the lime layer.

The scientists applied 30 pounds of a nitrogen fertilizer per acre to one-third of the crop plots at each site, 60 pounds on another third, and did not add any nitrogen fertilizer to the remaining third of the plots. They applied 48 pounds of a phosphorous fertilizer, per acre, on half of the crop plots in each field.

In 1979, the scientists planted hard red winter wheat on 24 plots on each site. They left the other plots fallow as area farmers do and alternated plots every year.

Average yields from the experiment for 1980 and 1981, on plots with no nitrogen added, were: 45.2 bushels per acre on plots with 6 inches of topsoil added; 26.8 bushels per acre on plots left undisturbed; 14.4 bushels per acre on plots with 6 inches removed; 10.6

bushels per acre on plots with 12 inches removed.

Adding a heavy dose—60 pounds per acre—of nitrogen fertilizer to the plots with 12 inches of soil removed increased the average yield per acre to 27.9 bushels, only 1.1 bushels more than the yield from the undisturbed plots that had no nitrogen added. At a price of \$4 a bushel that 1.1 bushels per acre brings farmers \$4.40, but the 60 pounds of fertilizer per acre costs \$18.

Dr. Massee said the stored soil moisture was uniform on all plots and precipitation was above normal during 1980 and 1981. Since the phosphorous treatments did not make any significant difference in yields, Dr. Massee averaged the results from all plots with the same nitrogen and erosion treatment, regardless of whether they had phosphorus applied or not.

Dr. Massee will continue his experiment at least 2 more years but says there are enough data now to prove that soil erosion significantly reduces crop yields. The experiment is part of a national Agricultural Research Service program, which the Soil Conservation Service helped plan, to study the relationship between soil erosion and soil productivity.

Inspired by Dr. Massee's previous articles on soil erosion's effects on wheat yields, Marlow Freckleton, SCS area resource conservationist in Pocatello, decided to measure soil depth and crop yield on sample plots on several farms in the Rock Creek Valley watershed south of the Snake River to justify the costs of a land treatment project.

Freckleton's measurements during the 1980 harvest season

matched Dr. Massee's: fields with at least 20 inches of topsoil above the lime layer produced 40 to 50 bushels of wheat per acre while eroded fields with 7 to 9 inches of topsoil above the lime layer produced only 12 to 15 bushels of wheat per acre.

Freckleton and Massee agree that keeping topsoil in place, at least 20 inches above the lime layer, is the most profitable way to raise winter wheat in southeastern Idaho.

Sharon Norris,
public information officer, SCS, Boise, Idaho

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*,
SCS, Washington, D.C.

Research Yields Small-Scale Forage and Livestock Ideas

The best tools for today's small-scale livestock farmer may be up-to-date knowledge and old-fashioned savvy, according to USDA's Agricultural Research Service Agronomist William C.

Templeton. Templeton is director of USDA's Regional Pasture Research Laboratory in University Park, Pa.

At a recent special symposium in Beltsville, Md., on small farm research, Templeton said that high energy costs and advanced technology have actually opened up options for the managers of small-scale livestock operations rather than limited them. Templeton discussed a broad range of forage and livestock management ideas at the symposium, based on the latest research.

"You don't always need lots of chemicals or the latest equipment

to improve forage and livestock production," Templeton said. "Research shows that low-producing, or degenerated, pastures can be improved in other ways. Pastures grazed or clipped to about 2 inches of growth in the fall and then seeded with a legume crop by minimum tillage or no-till methods in late winter or early spring show substantial increases in available forage. The pasture is grazed or clipped short in the fall to reduce the vigor of the grass and lessen the competition for the legume crop planted in the spring. Red clover has proven to be an especially successful legume crop in the Northeast and Central States because it germinates rapidly, has high seedling vigor, and can tolerate some shade."

Templeton also said that with increasing costs of nitrogen fertilizers, the role of legume plants—clover, alfalfa, vetch, and others—is being reassessed in forage management worldwide, because of the capacity of legumes to add nitrogen to the soil.

Field tests at University Park, Pa., have shown that pastures sown with a mixture of a grass and a legume are less weedy than pure grass stands. Furthermore, a combination of two kinds of pastures—pure grass fertilized with nitrogen and a grass and legume mixture—can provide continuous and relatively uniform livestock grazing from early spring through early winter. Applying nitrogen to cool season grasses such as orchardgrass, tall fescue, and Kentucky bluegrass 3 or 4 times a year, with one application late in winter, assures about 2 weeks earlier growth in spring.

After cattle graze the early spring growth they are moved to mixed grass and legume pastures. The extension of the growing season in pure grass pastures fertilized with nitrogen reduced the amount of winter feed needed in storage.

Pasture production generally peaks in the spring and again, but not as much, in the fall. Cattle forage needs, however, are uniform and even increase as calves grow. Templeton says that research favors stocking beef cattle more heavily in the spring on both kinds of pasture and making hay from ungrazed areas to insure that high amounts of feed are eaten. This means heavier stocking rates in spring when there is heavier forage and saving all that can be saved for stored feed for winter.

Overseeding of legumes into rundown or impoverished pastures in humid climates can markedly improve forage production and quality. Field tests of seeding methods have shown that with proper management, yields from broadcasting legume seed on the soil surface can equal yields from the more energy-intensive method of drilling in the seed even when herbicides are not used. Reducing the use of herbicides saves farmers money in two ways: it eliminates the cost of the chemical itself and saves the feed that would otherwise be killed by the herbicide.

Templeton also reported that grazing and feeding trials have shown that lambs grow 25 percent faster and young cattle 20 percent faster on legume-grass mixed pastures than on pure grass stands.

Grazing two or more species of livestock together sometimes of-

fers advantages. Cattle, sheep, and goats have different diet preferences. In a current trial there seems to be little overlap in the diets of sheep and goats with goats tending to be useful in removing brush.

High-producing dairy cows obviously require excellent nutrition. Keeping day-to-day milk quality up means high levels of feed energy, crude proteins, and minerals. Research shows, however, that considerable amounts of grains and protein supplements can be replaced by high quality forage feeds, without lowering production. Corn silage, alfalfa hay and silage, and well-managed pastures can supply large proportions of the dairy cow's requirements.

For dairy cows at pasture, farmers can save grain by allowing the highest producing cows to forage before dry cows and heifers. Research shows that milk production does not suffer by the practice.

There appears to be a widespread misunderstanding among livestock producers of the real significance of "weeds," Templeton said. Some so-called weeds have nutritive values which compare favorably with those of commonly used cultivated forage plants. Especially in parts of the South, crabgrass is a highly nutritious forage plant. Dandelion plants are readily eaten by sheep and have good nutritive value. Narrow leaf plantain, or buckhorn, is also highly nutritious. Depending on the type of weed and the amount, it may not be economical to control it with herbicides. This is more true with pastures and may not apply to hayfields.

Concerning soil, Templeton said,

you can't cheat biology. Limestone and mineral fertilizers unfortunately are sometimes not used when soil tests clearly indicate that a change in the acidity or mineral content of the soil would make a considerable improvement in forage production.

Finally, successful livestock farming based on forages requires careful attention to both the plant and the animal aspects of the operation. Templeton said that many livestock managers devote too much attention to one or the other, missing opportunities to integrate and thus improve their small-scale livestock farm.

"In all of our work at the pasture research laboratory we are mindful of protecting the soil and water," said Templeton.

Soil Scientist Tests Water Use by Forage Species

Forage species vary greatly in their water use efficiency. Ranchers who irrigate forages should consider the species best suited for their uses. Some dryland species, such as blue grama; crested, slender, and western wheat-grasses; and green needlegrass, produce more feed per unit of water used. However, these species cannot use much available water, and any excess added is not used for forage growth. Alfalfa and most irrigated grasses require relatively high amounts of water per unit of forage produced.

"Plant growth in semiarid regions of the Western United States is limited more by water than by any other factor," says Merle Fairbourn, soil scientist with USDA's Agricultural Research Serv-

ice in Cheyenne, Wyo. Fairbourn recently completed a study to determine the water use efficiency of several forage species and their ability to use available soil water during a harvest growing period. He conducted two tests. In the first test he evaluated 20 forage species in a greenhouse, and in the second test he evaluated 14 species in outdoor test plots. Fertilizer and harvest techniques were the same in both tests. All species were grown in Altvan soil, a fine sandy clay loam common to the Central High Plains States.

Fairbourn observed that where irrigation water is not limited, alfalfa and irrigated grasses will produce the most total forage. "These species have the ability to use high levels of water," says Fairbourn. The response of dryland grasses was surprising. Although soil water was available to these species, they couldn't use much of it. Apparently, the dryland species have adjusted over time to their natural environment of low moisture.

"Efficient forage production by the dryland grasses is favored by a low-level sustained water schedule," says Fairbourn. "Storing large amounts of water in soil does not improve production." Thickspike wheatgrass, a dryland species, acted as an irrigated grass and appeared to have the ability to adapt to either semiarid or humid environments. This makes it a useful species in reclamation of western rangelands.

Fairbourn's work can serve as a guide to farm and ranch operators for increasing water-use efficiency in forage production in the Western United States.

Awards Go to 4-H Youths for Natural Resource Conservation

At the 60th National 4-H Congress held in Chicago November 29 through December 3, 1981, six teenagers won awards in the Conservation of Natural Resources Program. All of the winners received \$1,000 scholarships, which were presented by John Deere, sponsor of the 4-H conservation program.

Brenda Robertson from Hasty, Colo., received an award for her work around the John Martin Reservoir, the largest body of water within 100 miles. She led other young people in planting 100 acres near the reservoir to provide winter feeding for deer and antelope. The young people also planted a fire line around the outer edge of the west side of the reservoir.

"A fire line is almost a must in our area because it is mostly dry prairie land surrounding the reservoir," Robertson said.

The 4-H'er raised more than 60 pheasants and released them on a private reserve with two ponds fed by the reservoir. She later returned to study waterflow in the ponds.

After Congress approved funds to provide a permanent pool at the reservoir for use by tourists and others, Robertson did a study on how animals were bearing up under the increase in human population.

"Most of the animals remained," Robertson said. "They only moved themselves a little farther into the cover and then came out during weekdays and winter." She decided the animals needed more cover and used some brush and dead branches from trees to build shelters.

Another of the winners was Lisa Clark of Greenwood, Del., who built and maintained 11 bird feeders and led other young people in planting 2,500 trees. Her simplest bird feed-

ing station was a 2-foot piece of board she attached to a window sill. "Others I made from the trunk of a discarded Christmas tree. I sawed it into 18-inch pieces, drilled six to eight holes about an inch deep, and stuffed the holes with suet," she said.

Anne Sutherland of Ann Arbor, Mich., won an award for making a complete plant and tree inventory along a 1.5-mile stretch of country road to aid in having it declared a "natural beauty road." She has a special interest in designation of the natural beauty road because it is the road on which her family home is located. The data she compiled have been used in public hearings on the proposal.

Since 1979, Sutherland has been a member of a State 4-H committee planning a State 4-H marine science and conservation camp. She has conducted a number of workshops on conservation and said, "I believe education to be the strongest and most effective way to create an environmentally conscious society."

She has organized a local 4-H conservation group in her area and led the young people on a number of outings, including canoe trips for aquatic study.

Another youth who won a scholarship was Shawn Hannar from Orlando, Fla. Over a 4-year period, he led other young people in collecting more than 50 tons of material for recycling.

He also made a study of animal tracks in Cloverleaf Park, surveyed damage to trees by insects, and did research on water resources. Other projects included making bird feeders, planting plants to attract birds to his yard, and doing research on solar energy.

Tom Reyburn of State College, Pa., won an award for using a puppet show to teach conservation to children. He also supervised 200 elementary school children in planting fir seedlings as a windbreak around their school.

An expert outdoorsman, Reyburn led five groups of 10 to 15 students on wilderness trips, teaching them conservation and botany, and exposing them to environmental and ecological concerns. He has been asked by his high school science coordinator to help plan an environmental school program for older students.

Another of the award winners, Marie Agun of Washougal, Wash., did research on the unusual geology of the county where Mount Saint Helens is located. She did her study, "A Guide to the Volcanic Cascades," 2 years before the May 18, 1980, eruption of Mount Saint Helens and included numerous photos.

Agun has completed projects in outdoor survival, range management, soil and water conservation, and forest management.

Nearly 523,000 4-H members participate in the conservation program, which is conducted by the Cooperative Extension Service and arranged by the National 4-H Council.

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Meetings

March	7-9	American Pulpwood Association, New Orleans, La.
	14-20	American Society of Photogrammetry and American Congress on Surveying and Mapping, Denver, Colo.
	19-21	National Wildlife Federation, Milwaukee, Wis.
	26-31	47th North American Wildlife and Natural Resources Conference, Portland, Oreg.
April	23-25	American Horticultural Society, Washington, D.C.
	25-28	Association of American Geographers, San Antonio, Tex.
May	5-7	Hardwood Plywood Manufacturers Association, New Orleans, La.
	16-20	American Water Works Association, Miami Beach, Fla.
	23-27	National Council of State Garden Clubs, Inc., Los Angeles, Calif.
	26-28	Forest Farmers Association, Lake Buena Vista, Fla.

New Publications

U.S.-Canadian Range Management, 1978-1980: A Selected Bibliography on Ranges, Pastures, Wildlife, Livestock, and Ranching

Edited by John F. Vallentine

This publication is a supplement to U.S.-Canadian Range Management, 1935-1977, published in 1978. It identifies and classifies the extensive range science literature available. It is an aid designed for use by students, scientists, natural resource managers, livestock producers, and agribusiness, as well as the general public inquiring about ranges, pastures, wildlife, livestock, and ranching. An indirect objective is to clarify the field of range management by showing its varied parts and interests and to promote the use of range science literature by people in related academic fields.

Entries are filed under a four-level classification system of 161 categories. The levels are divided into 10 primary categories, 43 secondary categories,

64 tertiary categories, and 44 fourth-level categories. A numbering system has been used to designate each of the categories under which bibliographic citations have been classified. The arrangement of the numbering system is illustrated in a topical outline.

The publication also contains an author index and a keyword subject index to expedite locating literature items in the bibliography.

Copies are available for \$45 from Oryx Press, 2214 North Central at Encanto, Phoenix, Ariz. 85004.

1981 National Directory of Landscape Architecture Firms

by the American Society of
Landscape Architects

This annual publication is designed to identify professional practice firms and consultants from across the country whose primary activity is landscape architecture. The directory contains an alphabetical listing of firms and a geographical expertise listing.

This publication is available free to individuals, corporations,

and government agencies interested in contracting for landscape architectural services.

Requests should be sent to 1981 National Directory of Landscape Architecture Firms, 1900 M Street, N.W., Suite 320-PR, Washington, D.C. 20036.

Winter Pastures and Stocker Cattle

by the Noble Foundation

This 67-page booklet has been prepared to help point out some of the winter pasture and stocker cattle management guidelines. Many of the suggestions are based on averages, and more specific plans should be developed for the individual operator.

Such factors as plant and soil management, plant establishment, and plant management for optimum forage production are discussed.

The booklet contains many useful tables and charts. At the back are 15 sample budgets for the grain-stocker operator.

A limited number of single copies are available from the Noble Foundation, Route One, Ardmore, Okla. 73401.

Desertification of the United States

by David Sheridan

This report, published by the Council on Environmental Quality, presents a description of current land and water use activities that are causing severe problems of desertification in major regions of the United States.

Copies are available for \$4.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. (Stock No. 041-011-00065-3.)

Recent Soil Surveys Published

by the Soil Conservation Service

Kentucky: Laurel and Rock Castle Counties.

Massachusetts: Hampshire County.

Mississippi: Hancock County.

North Carolina: Jones County.

Pennsylvania: Luzerne County.

Washington: Douglas County and Lincoln County.

Wyoming: Goshen County.